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January 27, 2004

Mr. John Janneck
c/o Laetitia Vineyard and Winery
453 Laetitia Drive
Arroyo Grande, California 93420

SUBJECT: Water Supply Assessment for Laetitia Vineyard and Winery, Arroyo Grande, California

Dear Mr. Janneck:

Cleath & Associates has completed a water supply assessment at Laetitia Vineyard and Winery related to existing water supply wells, springs, and the existing water supply system. This evaluation is based on site visits and upon previous work completed by Cleath & Associates at the site and on properties in the vicinity.

INTRODUCTION

Located northeast of Highway 101 approximately 1.2 miles northwest of Summit Station Road in Arroyo Grande, the site includes approximately 620 acres of vineyards, and a wine producing facility. The existing improvements at the site include the production building, wine tasting facility, two single-family residences, and a maintenance shop. The water supply consists of two separate systems: The domestic system includes two wells that provide water to the winery, shop, and residences. The irrigation system includes four wells, and two 25 acre-feet (AF) reservoirs providing irrigation water to the vineyards. A shallow well drilled adjacent to Los Berros Creek and an older windmill-powered well near the maintenance shop are both unequipped for water production. The site is shown in Figure 1.

CONDUCT OF STUDY

Cleath & Associates obtained and compiled well construction, production, and water quality information on the six producing wells at the site. In addition, two-hour constant-rate discharge pump tests were performed at each of the four irrigation wells. Interviews with Andres Buenrostro (vineyard manager) provided valuable information on the day to day operation of the irrigation and domestic systems. A discussion of the existing hydrogeologic setting at the site is also presented.

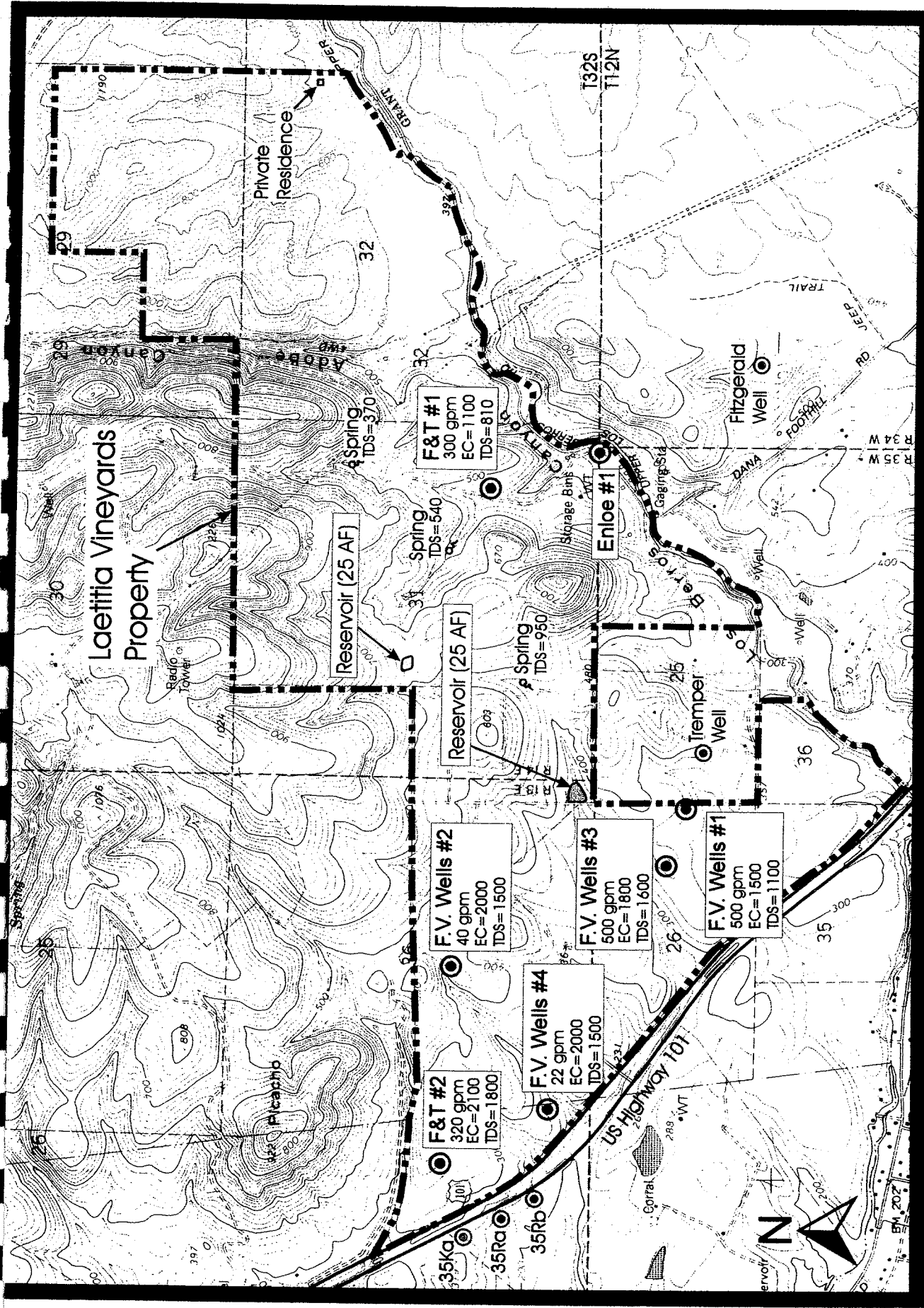


Figure 1
Site Map
Laetitia Vineyard & Winery
Cleath & Associates

Base map: U.S.G.S. 7.5 minute topographic, Oceano and Nipomo Quadrangles, CA

Base map scale: 1 inch = 2000 feet

Water quality from well samples obtained on December 10, 2003.

Well name and location	Well production in gallons per minute	Electrical conductance in umhos/cm	Total dissolved solids in mg/l	Spring location
320 gpm	EC=1880	TDS=1500	Spring location	



HYDROGEOLOGIC SETTING

Ground water at the site is present within the Miocene age Obispo Formation (Hall, 1973). This unit is volcanic in origin and is variable in composition. It typically consists of fractured fine to coarse-grained white tuff, and a fine-grained zeolitized, variably colored, very resistant tuff. An ashy matrix of coarse-grained tuff is commonly altered to montmorillonite clay. The Obispo Formation outcrops over several square miles in the vicinity of the site, and is folded into a series of northwest-southeast trending synclines and anticlines. A geologic map of the site and vicinity is shown in Figure 2.

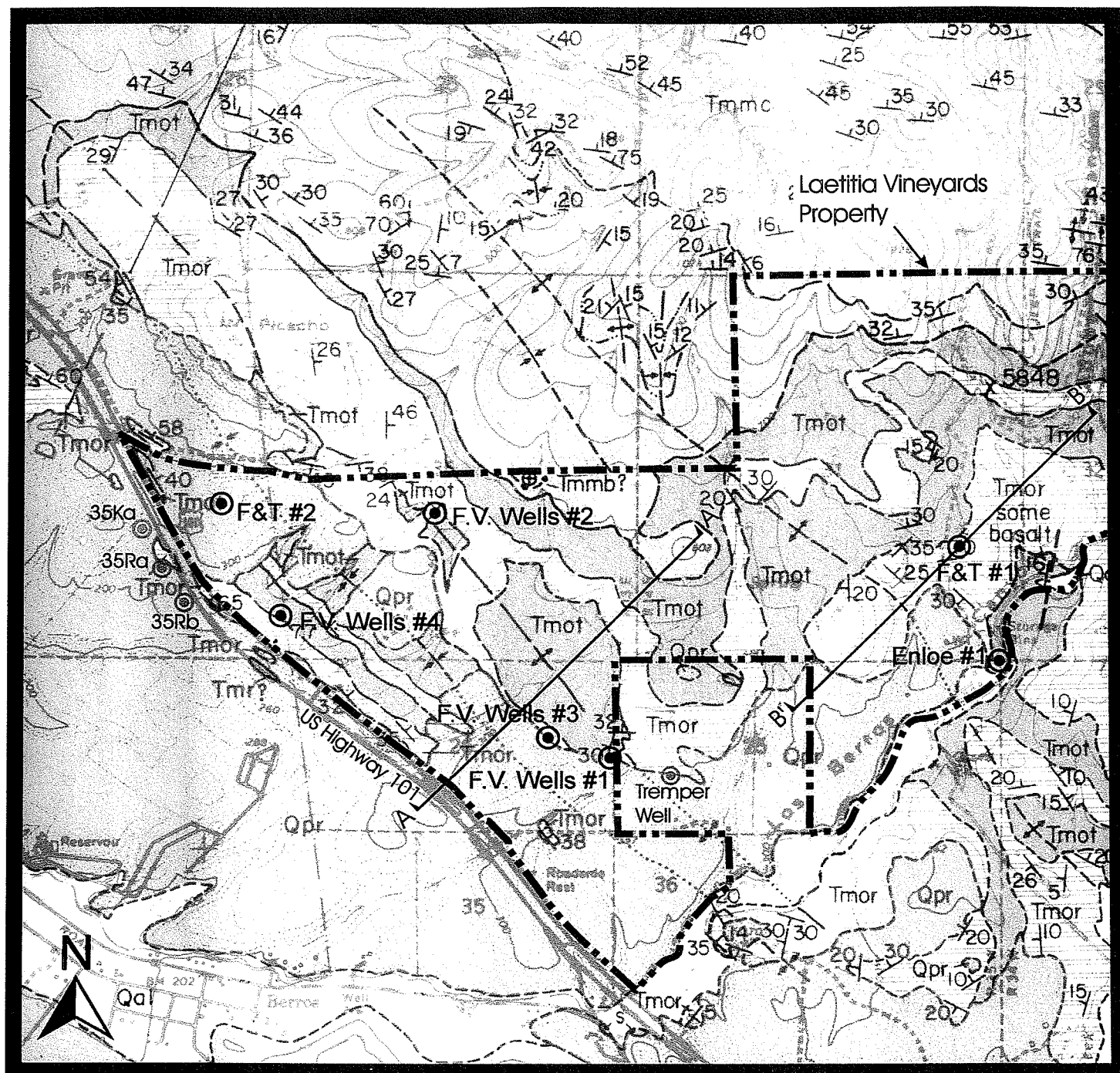
There are several of the fractured resistant tuff beds underlying the site which are discrete mappable units identified in the published geologic maps of the area. Each of these fractured tuff beds is an aquifer and is separated from overlying and underlying fractured tuff beds by low permeability ash and shale beds. The most productive aquifers occur within the fine-grained zeolitized, very resistant tuff beds. Two geologic cross sections are shown on Figure 3. The cross section locations are shown on Figure 2.

The four irrigation wells and the domestic well, F.V. Wells #2, tap the fractured tuff zones of the Obispo Formation. Located along U.S. Highway 101 and southwest of the Laetitia property, the three Bartleson deep irrigation wells are screened within the fractured tuff zones. The Tremper irrigation well is located approximately 800 feet southeast of F.V. Wells #1, and produces from the fractured tuff zones. Well locations are shown on Figure 1.

Springs are present within the Los Berros watershed and occur where the fractured rock aquifers outcrop along slopes. Three spring locations are shown on Figures 1 and 4. A spring located northwest of well F&T #1 has been developed with a spring box to convey water to a storage tank which in turn, supplies water to the Campodonico Ranch headquarters.

EXISTING WELL CONSTRUCTION

Seven wells have been constructed at the site between 1983 and 1999 (Figure 1). Two active domestic wells provide water to the winery and to the two residences and shop. A third well, "Enloe #1", was designed for use as a domestic well, and taps the shallow alluvium along Los Berros Creek. It has not been equipped with a pump and is considered to have a low production capacity compared to the other six wells at the site. The four remaining wells meet the irrigation demands of the 620 acres of vineyards. Wells F&T #1 and #2 were installed in 1998 to allow vineyard expansion to the west and to the east. It had been determined that pumping from the "Old" reservoir to blocks in the west and east sides was not practical because of the distance to those blocks, and the existing reservoir capacity would be inadequate to serve the expanded vineyard. The addition of the two new wells and the increased reservoir storage capacity allowed for irrigation of the entire vineyard within one week. A schematic drawing showing each of the producing wells and the main water system is included as Figure 5.



Explanation

Qal	Alluvial deposits
Qpr	Paso Robles Formation - sand, gravel, clay
Tmmb	Monterey Formation - siltstone or chert
Tmmc	Monterey Formation - cherty shale
Tmor	Obispo Formation - resistant tuff
Tmot	Obispo Formation - white tuff
Tmr	Rincon Formation - siltstone

↕ Anticline

↘ Syncline

↘³⁵ Strike and dip of bed

B — B' Geologic Cross Section Alignment

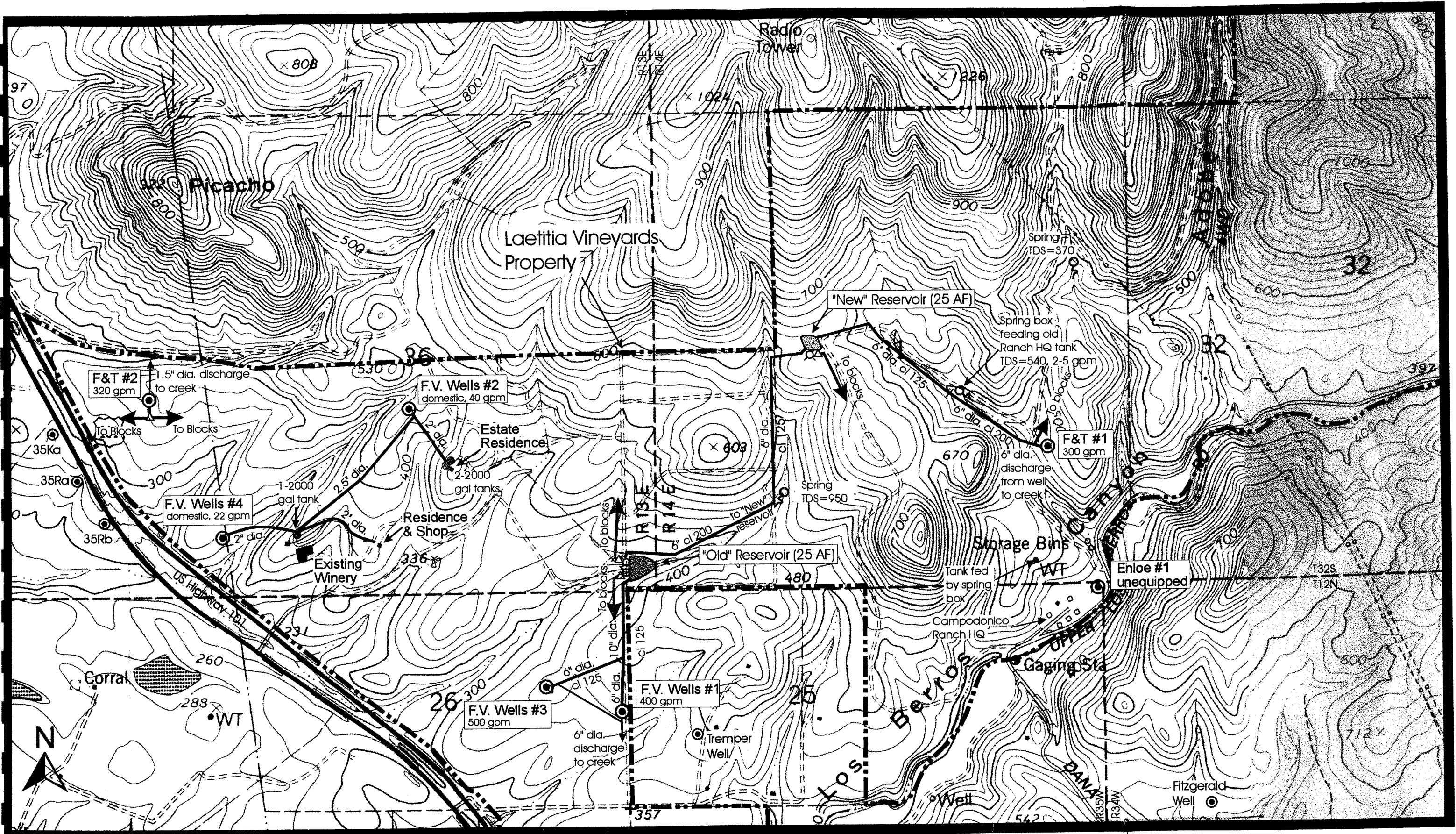
⊙ Well name and location

Base map: Geology of the Arroyo Grande Quadrangle, CDMG Map Sheet 24, Hall, 1973

Enlarged scale: 1 inch = 2,000 feet

Figure 2
Geologic Map
Laetitia Vineyard & Winery

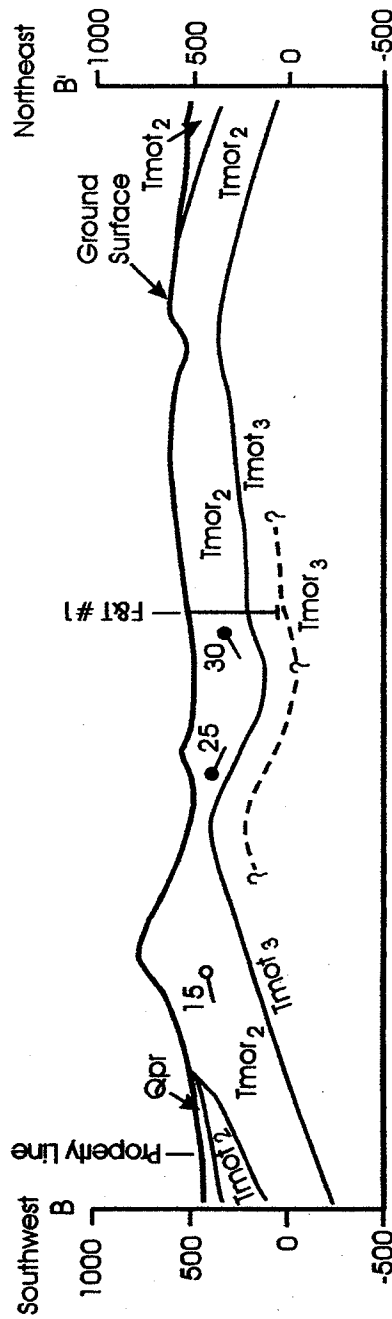
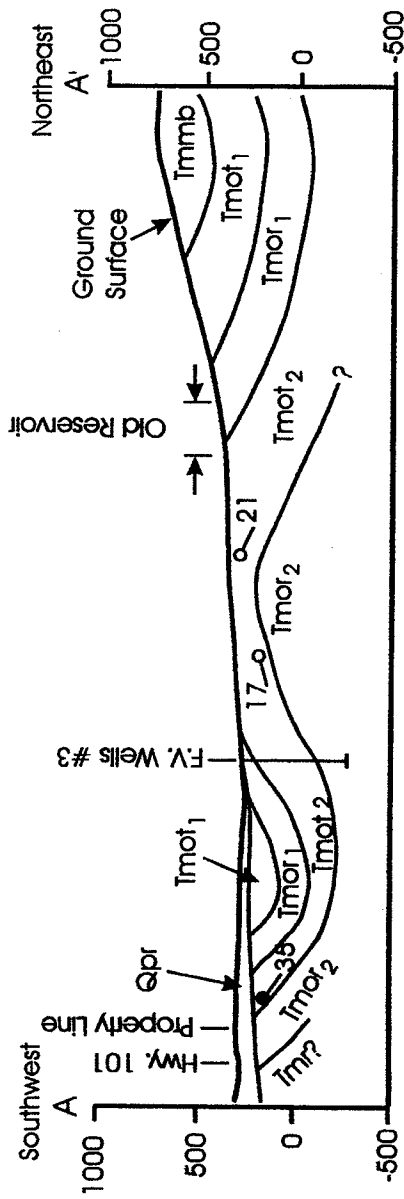
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Base map: U.S.G.S. 7.5 minute topographic,
 Oceano and Nipomo Quadrangles, CA
 Base map enlarged scale: 1 inch = 1000 feet

Explanation			
F.V. Wells #4	Well location and designation	TDS	Total dissolved solids in milligrams per liter
⌘	Booster pump (irrigation water to blocks)	500 gpm	Production rate in gallons per minute
Δ	Chemical feed location		
Q	Spring location		

Figure 4
 System Design
 Laetitia Vineyard & Winery
 Cleath & Associates



Explanation

- Qpr Paso Robles Formation - sand, gravel, clay
- Immb Monterey Formation - siltstone or chert
- Imor Obispo Formation - resistant tuff
- Imot Obispo Formation - white tuff
- Imr Rincon Formation - siltstone
- 35 True dip of bedding
- 21 Apparent dip of bedding

Scale: 1 inch = 1,000 feet
(vertical = horizontal)

Figure 3
Geologic Cross Sections
Laetitia Vineyard & Winery
Cleath & Associates

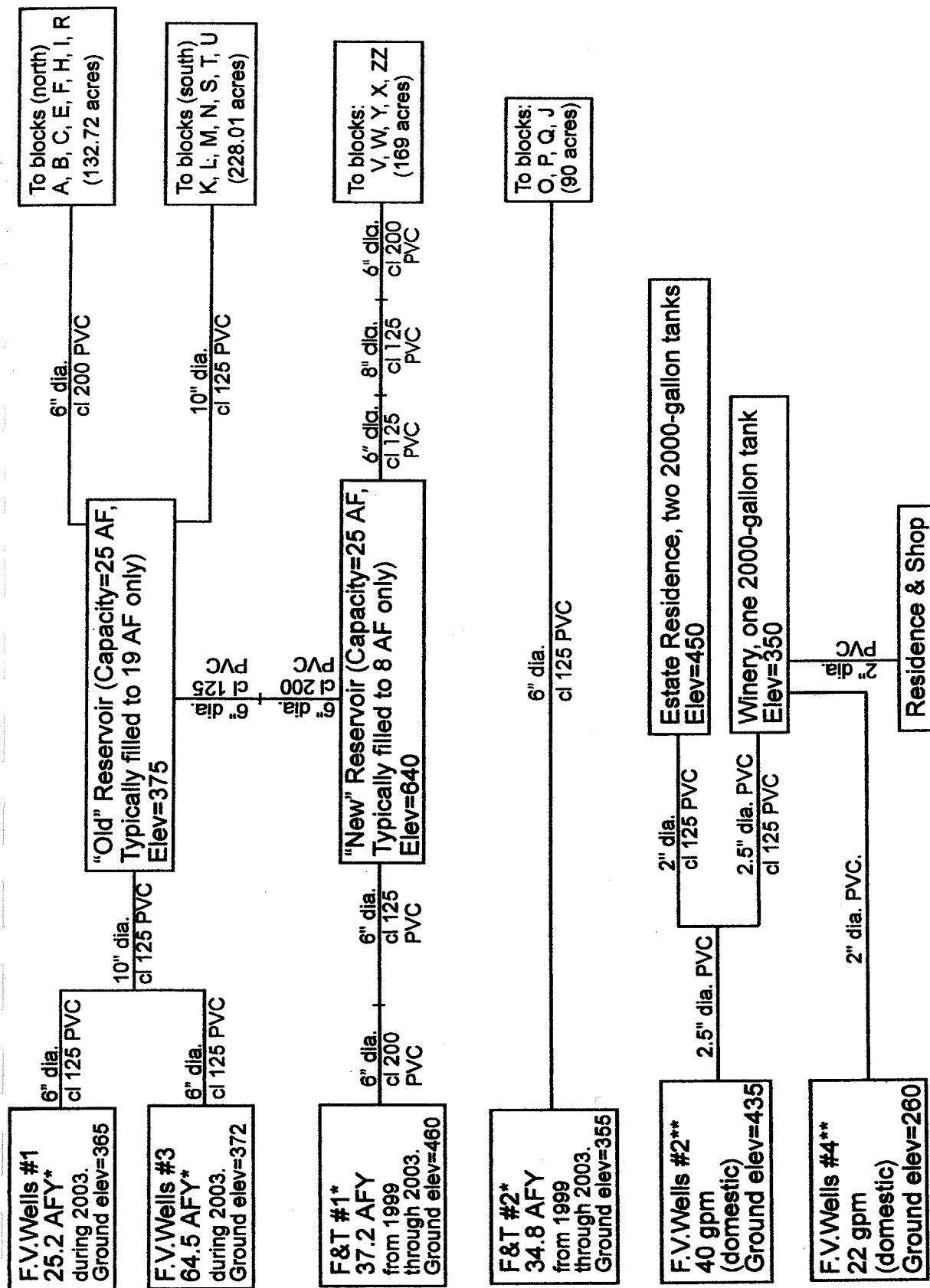



Figure 5
Water System Schematic
Laetitia Vineyard & Winery
Cleath & Associates

*Production rates are shown on Table 3, and based on well meters

**The combined production estimate for the domestic wells is 6.72 afy based upon meter readings for the Wine Production facility and estimated demands for the Wine Tasting facility, two residences, and maintenance shop.



Well data for each of the wells is included in Table 1. Well Completion Reports are included in Appendix A. The well names used in this report signify the well driller's name and the order in which they were drilled. The common well names used by vineyard personnel are included in the well descriptions below.

F.V. Wells #1

Also known as the "Propane Well", F.V. Wells #1 is located east of the winery and approximately 1,500 south of the "Old Reservoir". This well is 250 feet from the nearest "blue-line" stream as designated on the U.S.G.S. topographic map. The well is used for irrigation and is designed to pump to the "Old Reservoir". A six-inch discharge pipe was installed to divert water to the natural drainage feature 300 feet to the south. The well was drilled in 1983 by Floyd V. Wells, Inc. to a total depth of 392 feet. The well is cased using 12-inch diameter steel, and is equipped with a 60-hp turbine pump. The depth of the annular sanitary seal is unknown. The Well Completion Report is not available.

F.V. Wells #2

Also known as the "Estate Well", F.V. Wells #2 is located approximately 2,000 feet northeast of the winery. This well is 250 feet from the nearest "blue-line" stream as designated on the U.S.G.S. topographic map. The well provides domestic water to two 2,000-gallon storage tanks at the estate residence, and domestic water to one 2,000-gallon storage tank at the winery to supply water to the wine production building, the wine tasting facility, the vineyard manager's residence, and the maintenance shop. The well was drilled in 1988 by Floyd V. Wells, Inc. to a total depth of 525 feet. The test hole penetrated rocks of the Obispo Formation to the total depth of the hole. The well is cased using 12-inch PVC, with perforations (0.040-inch slot) from 185 to 310 feet depth, and from 445 to 520 feet depth. The annular sanitary seal extends from ground surface to a depth of 50 feet. The well is equipped with a 7.5 hp submersible pump.

F.V. Wells #3

Also known as the "Electric Well", F.V. Wells #3 is located approximately 900 feet northwest of F.V. Wells #1, and approximately 3,000 feet southeast of the winery facilities. This well is 600 feet from the nearest "blue-line" stream as designated on the U.S.G.S. topographic map. The well is used for irrigation, and is designed to pump to the "Old Reservoir". A six-inch discharge pipe was installed to divert water to the natural drainage feature 1,000 feet to the southeast. It was drilled in 1993 by Floyd V. Wells, Inc. to a total depth of 500 feet. The test hole penetrated rocks of the Obispo Formation to the total depth of the hole. The well is cased using 10-inch PVC, with perforations (0.040-inch slots) from 150 to 180, 200 to 250, 280 to 340, and from 360 to 500 feet depth. The annular sanitary seal extends from ground surface to a depth of 50 feet. The well is equipped with a 60 hp submersible pump.

Table 1
Well Data
Laetitia Vineyard & Winery

Well	F.V. Wells #1	F.V. Wells #3	F&T #1	F&T #2	Enloe #1	F.V. Wells #2	F.V. Wells #4
Common Name	Propane Well	Electric Well	Campodonico Well	Block "O" Well	--	Estate Well	Freeway Well
Date Completed	1983	Jul-93	Nov-98	Nov-98	Oct-99	Jul-88	Unknown
Well Type	Irrigation	Irrigation	Irrigation	Irrigation	Domestic	Domestic	Domestic
Acres Irrigated	360.73		169.21	89.92	--	--	--
Distribution	Pond		Pond	Direct irrigation	--	Estate & Winery	Winery
Pump Size (hp)	60 hp turbine	60 hp submersible	40 hp submersible	40 hp submersible	--	7.5 hp submersible	1.5 hp submersible
Pump Setting (feet below ground surface)	350	330	300	210	--	300	120
Design Head (in feet)	280	387	392	368	--	450	200
Design GPM	500	400	260	260	--	40	22
Current Production (gpm)	400	500	270	320	--	Unknown	Unknown
Hours Pumped per Day	24 for 1-2 days to pond, then off for 2-3 days	24 for 2-3 days to pond, then off for 2-3 days	24 for 2-3 days to pond, then off for 2-3 days	6-10 per day up to 4 days, then off for 1-2 weeks	--	Unknown	Unknown
Casing	12-inch steel	10-inch PVC	8-inch PVC	8-inch PVC	8-inch PVC	12-inch PVC	8-inch steel
Sanitary Seal	Unknown	50	50	52	23	50	Unknown
Depth							
Screened Interval (in feet below ground surface)	N/A	150-180; 200-250; 280-340; 360-500	325-425	250-310	25-65	185-310, 445-520	N/A
Total Depth (in feet below ground surface)	392	500	425	320	65	525	129
Electric Log	N/A	Yes	N/A	N/A	N/A	Yes	N/A
Well Completion	N/A	Yes	Yes	Yes	N/A	Yes	N/A
Report							
Water Quality	Yes	Yes	Yes	Yes	N/A	Yes	Yes
Comments	Sulfur odor	--	Sulfur odor	--	Not equipped	--	--

GPM = gallons per minute

N/A = not available or does not exist

hp = horse power

F.V. Wells #4

Also known as the "Freeway Well", F.V. Wells #4 is located approximately 700 feet west of the winery, and approximately 400 feet northeast of U.S. Highway 101. This well is 50 feet from the nearest "blue-line" stream as designated on the U.S.G.S. topographic map. The well provides domestic water along with well F.V. Wells #2 to the one 2,000-gallon storage tank at the winery to supply water to the production building, the wine tasting facility, the vineyard manager's residence, and the maintenance shop. The well was drilled by Floyd V. Wells, Inc. to a total depth of 129 feet. The well is cased using 8-inch steel, and is equipped with a 1.5 hp submersible pump. The depth of the annular sanitary seal is unknown. According to the vineyard manager, the well flows from the top of the well casing during the winter months. A Well Completion Report is not available.

F&T #1

Also known as the "Campodonico Well", F&T #1 is located in the eastern portion of the property, approximately 1,000 feet northwest of Los Berros Road. This well is 100 feet from the nearest "blue-line" stream as designated on the U.S.G.S. topographic map. The well is used for irrigation, and is designed to pump to the "New Reservoir". A six-inch discharge pipe was installed to divert water to the adjacent natural drainage feature that drains into Los Berros Creek. Water is typically diverted at pump start up for a few minutes because the water is initially discolored and has a strong sulfur odor.

The well was drilled in 1998 by Filipponi & Thompson Drilling, Inc., to a total depth of 425 feet. The test hole penetrated rocks of the Obispo Formation to the total depth of the hole. The well is cased using 8-inch PVC, with perforations (0.040-inch slot) from 325 to 425 feet depth. The annular sanitary seal extends from ground surface to a depth of 50 feet. The well is equipped with a 40 hp submersible pump.

F&T #2

Also known as the "Block O" well, F&T #2 is located in the western corner of the property, approximately 800 feet northeast of U.S. Highway 101, and approximately 2,200 feet northwest of the winery. This well is 600 feet from the nearest "blue-line" stream as designated on the U.S.G.S. topographic map. The well is used for irrigation, and is designed to pump directly to the vineyard blocks. A 1.5-inch discharge pipe was installed to divert water to the creek located approximately 500 feet to the north. The well was drilled in 1998 by Filipponi & Thompson Drilling, Inc., to a total depth of 320 feet. The test hole penetrated clay, sand and gravel deposits of the Paso Robles Formation to a depth of 47 feet, and fractured volcanic rocks of the Obispo Formation from a depth of 47 feet to the total depth of the hole. The well is cased using 8-inch PVC, with perforations (0.040-inch slot) from 250 to 310 feet depth. The annular sanitary seal extends from ground surface to a depth of 52 feet. The well is equipped with a 40 hp submersible pump.

Enloe #1

The well is located approximately 100 west of Los Berros Road along the eastern property boundary and approximately 1,600 feet southeast of well F&T #1. This well is 100 feet from the nearest "blue-line" stream as designated on the U.S.G.S. topographic map. The well is not equipped with a pump and has not been used since it was drilled in 1999 by Enloe Well Drilling. The test hole penetrated loosely consolidated stream sands and gravels to the total depth of the hole at 65 feet depth. The well is cased using 8-inch PVC, with perforations (0.040-inch slots) from 25 to 65 feet depth. The annular sanitary seal extends from ground surface to a depth of 23 feet.

WATER SYSTEM DESIGN

The domestic system includes two wells that provide water to the winery, shop, and the two residences. The irrigation system includes four wells, and two 25 AF reservoirs providing irrigation water to the vineyards. A map showing system wells, main pipelines, and reservoirs is shown on Figure 4, and a schematic depiction of the main components of the two systems is shown on Figure 5. The irrigation piping system within the vineyard blocks are shown on detailed construction drawings located in the vineyard manager's office at the maintenance shop.

The 620 acres of vineyard are divided into blocks in which one grape varietal is grown. In general, the blocks are irrigated one block at a time, or one set of blocks at a time from the "Old" Reservoir, the "New" reservoir, and directly from well F&T #2. These three sources can provide irrigation water simultaneously to enable a complete cycle of irrigation to the entire vineyard within one week. A listing of blocks showing acres of irrigated vineyard per block and the grape varietal is shown on Table 2.

Most of the blocks are irrigated by pumping from the two reservoirs. Irrigation water for blocks O, P, Q, and J on the westerly portion of the property are supplied directly from well F&T #2. The entire vineyard is irrigated by drip irrigation. According to the vineyard manager, there has been no need for a frost protection spray system. One chemical injection point serving the blocks in the easterly portion of the property is located at the "New" reservoir immediately downstream of the booster pump. At the "Old" reservoir, there are two injection points. One is located adjacent to a booster pump serving blocks to the north, and one is located adjacent to the booster pump serving blocks to the south. The primary use of the injection points is to add chemical fertilizer to the irrigation water.

A 6-inch diameter pipeline extends from the "Old" reservoir to allow for pumping to the "New" reservoir in the event that water from well F&T #1 cannot be pumped to the reservoir. During the irrigation season, the "Old" reservoir is typically filled only to 19 AF, and the "New" reservoir is typically filled to 8 AF. According to the vineyard manager, these reservoir volumes are all that are required to meet the irrigation demands. At the "Old" reservoir, the booster pump for the northern blocks pumps at a maximum capacity of 300 gallons per minute (gpm), and the booster pump for the southern blocks pumps at a maximum capacity of 700 gpm. At the "New" reservoir, the booster pump delivers water to the blocks to the east at a maximum of 425 gpm.

Table 2
Irrigated Blocks
Laetitia Vineyard & Winery

F.V. Wells #1 and #3 to "Old Reservoir"			F&T #1 to "New Reservoir"			F&T #2 Directly to Blocks		
Acres	Block	Grapes	Acres	Block	Grapes	Acres	Block	Grapes
19.35	A	Pinot Noir	57.16	V	Pinot Noir	46.12	O	Pinot Noir
3.05	B	Pinot Blanc	24.65	W	Syrah	20.1	P	Pinot Gris
23.97	C	Pinot Blanc	26.45	Y	Pinot Noir	14.27	Q	Pinot Noir
21.45	E	Pinot Blanc	12.67	X	Pinot Noir	9.43	J	Pinot Noir
13.46	F	Pinot Noir	48.28	ZZ	Tempranillo-west			
16.72	H	Chardonay			Chardonay-east			
11.34	I	Pinot Noir						
12.29	K	Pinot Noir						
9.88	L	Chardonnay						
57.59	M	Pinot Noir						
74.33	N	Pinot Noir						
23.38	R	Pinot Noir						
24.3	S	Pinot Noir						
37.98	T	Pinot Noir						
11.64	U	Pinot Noir						
360.73 Total Acres			169.21 Total Acres			89.92 Total Acres		

Note:

Shaded areas represent blocks underlain by more permeable soils, and consequently have a higher irrigation demand.



WELL PRODUCTION

Irrigation Wells

Production information was based on metered flow at each of the wells, and from irrigation schedules received from the vineyard manager. The flow meters show total water produced in gallons. Wells F&T #1 and #2 have been metered since January 1999, whereas F.V. Wells #1 and #3 have been metered only since January 2003. Production amounts in terms of acre-feet per year (AFY) and number of acres irrigated by each well are shown in Table 3. The total production prorated for the year 2003 was 161 AF. An estimate of irrigation water volumes per acre for 2003 is 0.26 AFY per acre. Well F.V. Wells #1 produced the lowest volume in 2003 of the four wells, at 25 AFY, and well F.V. Wells #3 produced the greatest volume at 64 AFY. According to the vineyard manager, F.V. Wells #3 was pumped more than F.V. Wells #1 because of higher iron and sulfide concentrations in samples from F.V. Wells #1. It should be noted, however, that total hardness, electrical conductance, and total dissolved solid concentrations were higher in F.V. Wells #3 than in F.V. Wells #1 in samples collected in December 2003. High iron concentrations may cause physical problems within the irrigation system, because of the potential to cause clogging of emitters.

Blocks irrigated by well F&T #2 receive the greatest volume of water per acre at 0.39 AFY per acre irrigated. This may be because three of the four blocks irrigated are underlain by more permeable soil than the soil underlying other blocks, and consequently have a higher irrigation demand. According to the vineyard manager, the different grapes have similar irrigation demands.

The irrigation wells are pumped only during the dry months of the year. Irrigation does not occur at all during January, February, March, November, and December. During April, the vineyards are irrigated every other week for one day. During May they are irrigated one day per week, and during June, July, and August, irrigation in each block takes place two days per week. In September, the vineyards are irrigated one day per week per block. In October, there is generally very little irrigation and it is dependent on precipitation.

During the irrigation season, well F&T #2 may be pumped 6 to 10 hours per day for up to four days, (one day per block) then it would be off for one to two weeks. F.V. Wells #3 and F&T #1 are generally pumped 24 hours per day for two to three days, followed by a period of no pumping for two to three days. F.V. Wells #1 is generally pumped 24 hours per day for one to two days, followed by no pumping for two to three days.

During well pumping, the valves at the wells are completely open, giving the pumping rates as shown in Table 1 under "Current Production (gpm)". For wells F.V. Wells #1, F.V. Wells #3, F&T #1, and F&T #2 production rates are 400, 500, 270, and 320 gpm respectively.


Records of irrigation schedules for the year 1994 were provided by the vineyard manager. The records represent blocks irrigated from wells F.V. Wells #1 and F.V. Wells #3. Based on this information, it was determined that an irrigation rate of 0.25 AFY per acre was applied. This rate is essentially equal

Table 3
Well Production of Irrigation Wells
Lactitia Vineyard & Winery

Well	F&T #1	F&T #2	F.V. Wells #1	F.V. Wells #3	Totals
Meter Reading October 28, 2003 (gallons)	59426000	56453000	7469000	19254000	—
Meter installed	Jan-99	Jan-99	Jan-03	Jan-03	—
Metered interval	59 months	59 months	11 months	11 months	—
Total Acre-feet	182	173	23	59	437
AFY	37	35	25	64	161
Acres irrigated	169.21	89.92	360.73		619.86
AFY per acre irrigated	0.22	0.39	0.25		0.26

Note:

F.V. Wells #3 is pumped more than F.V. Wells #1 because of higher iron and sulfide concentration in F.V. Wells #1



to the production rate for the same wells during 2003. The 1994 irrigation schedule and spreadsheet calculations by Cleath & Associates are provided in Appendix B.


According to the vineyard manager, the vineyard irrigation system is operated to minimize waste and to use water efficiently. Irrigation schedules are based in part by measuring leaf moisture at plants within the various blocks. The fact that there is no frost protection spray system also reduces water use in the vineyard. The average production of 0.26 AFY per acre at Laetitia is a low volume when compared to demands for vineyards listed in published reports for San Luis Obispo County.

Cleath & Associates had discussions with grape growers in the Edna Valley and in the Nipomo area, and with the Laetitia vineyard manager concerning irrigation rates and vineyard practices. The purpose of these discussions was to compare irrigation rates at Laetitia with rates in other local vineyards. George Denati of Pacific Vineyards in the Edna Valley irrigates at a rate of 0.33 to 0.5 AFY/acre, with higher rates during drought conditions. He stated that the low rate at the Laetitia vineyards is reasonable and is desirable. Flow meter readings are recorded annually and are frequently observed at Pacific Vineyards to determine the irrigation rates. Conversations with Jean-Pierre Wolff of Wolff Vineyards in the Edna Valley stated that the five most important factors in vineyard irrigation are 1) soil type, 2) slope conditions, 3) root stock, 4) desired yield, and 5) vine spacing. According to Wolff, the low irrigation rates at Laetitia are reasonable based on vineyard practices that take these factors into consideration. In a conversation with the Laetitia vineyard manager, root stocks are planted in specific locations based in part on soil types, slopes, and their tolerance to drought conditions. According to the vineyard manager the average grape yield at Laetitia is approximately 3 tons per acre. This yield is considered relatively low, and may be the result of the low irrigation rates.

Records of irrigation schedules for the year 1994 were provided by the vineyard manager. The records represent blocks irrigated from wells F.V. Wells #1 and F.V. Wells #3. Based on this information, it was determined that an irrigation rate of 0.25 AFY per acre was applied. This rate is essentially equal to the production rate for the same wells during 2003. The 1994 irrigation schedule and spreadsheet calculations by Cleath & Associates are provided in Appendix B.

Domestic Wells

Because the two domestic wells serve the winery facilities, maintenance shop, and two residences through three-2,000 gallon storage tanks, they are pumped frequently each day. Because the pumping cycle is so frequent, and no discharge piping exists, it was not possible to perform a constant rate pump test. The design flow rate for F.V. Wells #2 ("Estate Well") and F.V. Wells #4 ("Freeway Well") are 40 and 22 gpm respectively. The wells are not metered, however, the winery facility (not including the tasting room or landscape irrigation), is metered, and used 1,479,634 gallons (4.5 AF) during 2003. An estimate of the combined annual production for the two domestic wells was made using water demands for facilities similar to the tasting room/offices, maintenance shop and the two residences. The annual demands for the winery facilities are:



Production Building	4.5 AFY (metered, 2003)
Estate House	0.76 AFY (from Arroyo Grande Water Master Plan)
Vineyard Manager's House	0.45 AFY (from Arroyo Grande Water Master Plan)
Maintenance Shop	0.22 AFY (from City of San Luis Obispo Water Use Factors)
Wine Tasting Facility	0.79 AFY (from City of San Luis Obispo Water Use Factors)

Based on the above annual volumes, it is estimated that the combined production of the two domestic wells is 6.72 AFY.

The Enloe #1 well, located along Los Berros Creek, was designed for domestic use for the former Campodonico Ranch headquarters. There are no production records for this well.

In addition to the domestic wells at the site, a six-foot deep sump provides the domestic water supply to a private residence located near Los Berros Creek along the eastern property boundary. The sump is located adjacent to the active stream channel, and receives underflow water from stream sands and gravels. The residence is shown on Figure 1.

PUMPING TEST ANALYSIS

Each of the four irrigation wells was pump tested to determine rates of drawdown under normal irrigation pumping conditions. The two domestic wells were not tested because of the high frequency of pumping cycles. Pump test data are included in Appendix C.

F.V. Wells #1

The water level prior to the start of the constant discharge test was measured at 106.3 feet depth. The well was pumped at a constant discharge rate of 390 gpm after a lower rate of approximately 150 gpm during the first four minutes of the test due to required engine warm-up. The pumping water level reached 139.3 feet depth after 140 minutes of pumping. The rate of water level decline based on stabilized rate of decline was four feet of drawdown per log cycle of time. The test indicated a transmissivity of 25,740 gallons per day per foot of drawdown. The water level had recovered to within 2.7 feet of the original static level (106.3 feet depth) after five minutes following pump shut down.

F.V. Wells #3

The water level prior to the start of the pump test was measured at 131.3 feet depth. The well was pumped at a constant discharge rate of 500 gpm. The pumping water level reached 308.1 feet depth after 120 minutes of pumping. The rate of water level decline was 26.2 feet of drawdown per log cycle of time. The test indicated a transmissivity of 5,038 gallons per day per foot of drawdown. The water level had recovered to within 41.7 feet of the original static level (131.3 feet depth) after four minutes following pump shut down.



F&T #1

Two pump tests were performed at the well. The first test was performed shortly after the well was completed in 1998, and represents the conditions that existed before any pumping of the aquifer had taken place in the area. The second pump test in December 2003 represents conditions within the aquifer after the well has been utilized for irrigation for the previous five years. The test results indicated that drawdown during both tests was minimal.

The water level prior to the start of the pump test in December 2003 was measured at 147.7 feet depth. The well was pumped at a constant discharge rate of 270 gpm. The pumping water level reached 183.5 feet depth after 120 minutes of pumping. The rate of drawdown had nearly stabilized after five minutes of pumping. The water level had recovered to within 0.2 feet of the original static level (147.7 feet depth) after eight minutes following pump shut down.

The water level prior to the start of the 1998 pump test was 128.9 feet depth. The well was pumped at a constant rate of 300 gpm and ran for 15 hours. The pumping water level stabilized at 172.9 feet depth. The water level had recovered to within 1 foot of the original static level after 1 hour following pump shut down.

F&T #2

Two pump tests were also performed at this well. The water level prior to the start of the pump test in December 2003 was measured at 103.7 feet depth. The well was pumped at a constant rate of 340 gpm. The pumping water level stabilized at 110.7 feet depth after five minutes of pumping. Because of the constant water level, the pump test was terminated after one hour of pumping. The water level had recovered to within 3.5 feet of the original static level (103.7 feet depth) after six minutes following pump shut down.

Prior to the start of the 1998 pump test, the static water level was measured at 97.4 feet. The well was pumped at a constant rate of 412 gpm and ran for four hours. The pumping level had reached 117.7 feet depth at the end of the test. During the recovery test the water level had recovered to within 3.3 feet of the original static level after 30 minutes following pump shut down. The rate of water level decline at the end of the test was four feet of drawdown per log cycle of time. Prior to drilling F&T #2, a test hole had been advanced and was subsequently used as an observation well during the constant rate discharge test. Analysis of the observation well data indicates an aquifer transmissivity of 31,000 gallons per day per foot of aquifer.

GROUND WATER LEVELS AND FLOW

Depth to ground water was measured in the four irrigation wells, the two domestic wells, and the unequipped Enloe #1 well. Water level measurements were recorded in various wells in 1983, 1993, and 1998 by others, and on October 31, November 4, and December 10 and 11, 2003, and on January

5, 2004 by Cleath & Associates. The depths to ground water and ground water elevation are summarized in Table 4. Ground water elevation contours were generated from water levels measured on November 4, 2003 and are presented in Figure 6. Depths to ground water were measured a few weeks following the last irrigation cycles of the year, and at the beginning of the wet season. As a result, these ground water elevations are expected to be higher than the elevations that would exist during the dryer season when irrigation pumping is occurring.

Estimated ground water flow directions and hydraulic gradients are shown in Figure 6. Ground water beneath the east portion of the site flows to the south toward Los Berros Creek at an estimated average hydraulic gradient of 0.021 vertical feet of head loss per horizontal foot of distance. Ground water beneath the west portion of the site flows to the southwest toward the alluvial basin south of U.S. Highway 101 at an estimated average hydraulic gradient of 0.014 vertical feet of head loss per horizontal foot of distance.

Ground water elevation data were examined to detect possible trends in water level changes. Although measurements indicate that water levels have generally dropped since the wells were constructed, no clear trends are apparent because of the paucity of water level data.

WATER QUALITY

Water samples collected from each of the six wells were submitted to Creek Environmental Laboratories, Inc., of San Luis Obispo, for an irrigation water analysis evaluation. Laboratory results are summarized in Table 5, and laboratory reports are included in Appendix D. Laboratory results indicate that ground water from well F&T #1 has the best water quality of all the wells, however, treatment for high sulfide and iron concentrations is recommended if the well were to be used for domestic purposes.

Samples from each of the wells except well F&T #1 exhibited TDS concentrations above the recommended maximum contaminant level (MCL) of 1,000 mg/l established by the California Department of Health Services. Concentrations of iron exceeding the MCL of 0.3 mg/l were detected in samples from wells F.V. Wells #1, F&T #1, F&T #2 and from the domestic well F.V. Wells #4. Concentrations of manganese above the MCL of 0.05 mg/l were detected in samples from wells F&T #2, and from the two domestic wells F.V. Wells #2 and #4. The sample collected from well F&T #2 had concentrations of sulfate above the MCL of 500 mg/l. Electrical conductance levels exceeded the MCL in samples from the two domestic wells and in samples from wells F.V. Wells #3 and F&T #2. MCLs have not been established for hydrogen sulfide concentrations in ground water, however, elevated concentrations were detected in samples from wells F.V. Wells #1 and F&T #1. Concentrations at these levels should be treated prior to domestic use.

Water samples were collected from three springs and analyzed in the field to determine total dissolved solids (TDS) concentrations. The spring farthest to the northeast, located 2,000 feet north of well F&T #1, exhibited the lowest concentrations of TDS of the three springs at 370 milligrams per liter (mg/l).

Table 4
Ground Water Elevations
Laetitia Vineyard & Winery

Well	Date	Depth to Water (in feet)	Reference point¹ (elevation in feet)	Ground water elevation (in feet)
F.V. Wells #1	1/14/83	69	365	296
	11/4/03	117.22	365	248
	12/9/03	106.25	365	259
F.V. Wells #3	7/9/93	124	372	248
	11/4/03	130.44	372	242
	12/10/03	119.39	372	253
	1/5/04 ²	131.34	372	241
F&T #1	11/9/98	128.90	460	331
	11/4/03	148.13	460	312
	12/10/03	147.7	460	312
F&T #2	11/13/98	90.0	355	265
	11/17/98	97.4	355	258
	10/31/03	114.43	355	241
	11/4/03	112.49	355	243
	12/10/03 ²	103.74	355	251
Enloe #1 (domestic)	11/4/03	51.75	325	273
	12/11/03	52.10	325	273
F.V. Wells #2 ("Estate" Well, domestic)	9/20/88	228	435	207
	11/17/94	204	435	231
	10/31/03	210.02	435	225
	11/4/03	216.25	435	219
F.V. Wells #4 ("Freeway" Well, domestic)	11/17/94	18	260	242
	10/31/03	23.00	260	237
	11/4/03	20.80	260	239

¹Reference points from topographic map by Vaughan Surveys, Inc., Paso Robles, California 2003

²Depth to water measured by pressurized air line

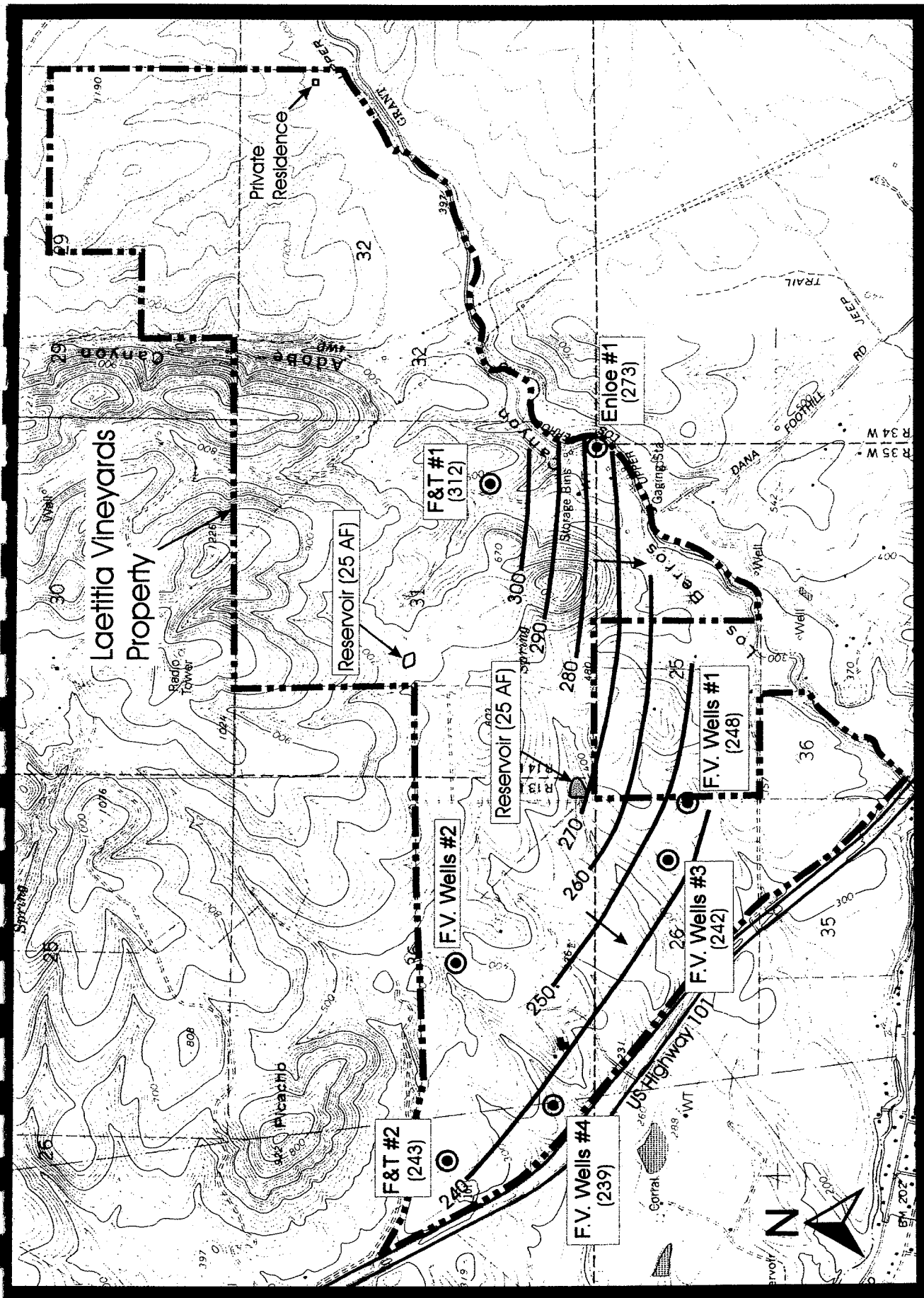


Figure 6
Ground Water Elevation
Contours on November 4, 2003
Laetitia Vineyard & Winery
Cleath & Associates

Explanation	
F&T #1 (312)	Well name and ground water elevation in feet above sea level
300	Ground water elevation contour, elevation in feet above sea level
→	Ground water flow direction

Base map: U.S.G.S. 7.5 minute topographic, Oceano and Nipomo Quadrangles, CA

Base map scale: 1 inch = 2000 feet

Table 5
Analytical Results of Water Samples
Laetitia Vineyard & Winery

Analyte / Date		MCL	Results (mg/l except where noted)					
			F.V. Wells #1	F.V. Wells #3	F&T #1	F&T #2	F.V. Wells #2 (domestic)	F.V. Wells #4 (domestic)
Total Hardness	07/14/88	-					680	
	11/10/98				440			
	11/17/98					910		
	12/10/03		570	740	420	930	700	710
Sodium Adsorption Ratio	07/14/88	-					7.0	
	11/10/98				2.3			
	11/17/98					1.8		
	12/10/03		2.5	2.5	2.0	1.7	2.4	2.3
Calcium	07/14/88	-					104	
	11/10/98				81			
	11/17/98					170		
	12/10/03		100	140	78	170	130	130
Magnesium	07/14/88	-					102	
	11/10/98				57			
	11/17/98					120		
	12/10/03		76	93	55	120	92	92
Sodium	07/14/88	-					304	
	11/10/98				110			
	11/17/98					120		
	12/10/03		130	150	92	120	140	140
Potassium	07/14/88	-					12	
	11/10/98				8			
	11/17/98					8.4		
	12/10/03		11	11	7.7	8.3	16	17
Boron	07/14/88	-					0.4	
	11/10/98				0.2			
	11/17/98					0.15		
	12/10/03		0.19	0.14	0.16	0.11	0.11	0.11
Copper, total	07/14/88	1					<0.02	
	11/10/98				<0.05			
	11/17/98					<0.005		
	12/10/03		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron, total	07/14/88	0.3					0.08	
	11/10/98				<0.05			
	11/17/98					2.3		
	12/10/03		0.5	0.2	0.5	2.5	0.2	3.4
Manganese, total	07/14/88	0.05					0.11	
	11/10/98				0.04			
	11/17/98					0.075		
	12/10/03		0.05	<0.03	0.04	0.08	0.15	0.21
Zinc, total	07/14/88	5					0.02	
	11/10/98				<0.05			
	11/17/98					<0.02		
	12/10/03		<0.05	<0.05	0.13	<0.05	0.08	<0.05

Table 5
Analytical Results of Water Samples
Laetitia Vineyard & Winery

Analyte / Date		MCL	Results (mg/l except where noted)					
			F.V. Wells #1	F.V. Wells #3	F&T #1	F&T #2	F.V. Wells #2 (domestic)	F.V. Wells #4 (domestic)
Electrical Conductance (umhos/cm)	07/14/88	1600					1750	
	11/10/98				1200			
	11/17/98					1880		
	12/10/03		1500	1800	1100	2100	2000	2000
Total Alkalinity, as CaCO ₃	11/10/98	—			320			
	11/17/98					330		
	12/10/03		350	330	320	330	320	310
Total Dissolved Solids	07/14/88	1000					1292	
	11/10/98				910			
	11/17/98					1,500		
	12/10/03		1100	1600	810	1800	1500	1500
pH (units)	07/14/88	—					7.1	
	11/10/98				7.6			
	11/17/98					7.2		
	12/10/03		7.6	7.2	7.3	7.3	7.3	7.1
Chloride	07/14/88	500					340	
	11/10/98				74			
	11/17/98					230		
	12/10/03		160	260	71	240	260	280
Barium	07/14/88	1					0.088	
Nitrate as N	07/14/88	10					0.4	
	11/10/98				<0.4			
	11/17/98					<0.1		
	12/10/03		<0.1	<0.1	<0.1	<0.1	<0.1	0.2
Nitrate as NO ₃	07/14/88	45					1.8	
	12/10/03		<0.4	<0.4	<0.4	<0.4	<0.4	0.7
Fluoride	07/14/88	2					0.68	
	11/10/98				0.4			
Sulfate	07/14/88	500					243	
	11/10/98				190			
	11/17/98					660		
	12/10/03		300	490	220	620	380	400
Sulfide	07/14/88	—						
	11/10/03				0.5			
	12/10/03		5.6		14			

mg/l = milligrams per liter

MCL = maximum contaminant level

Shaded areas indicate concentrations exceeding MCL's

Concentrations of TDS in the spring located 1,100 feet northwest of well F&T #1 was 540 mg/l. This spring has been developed with a spring box that feeds the Campodonico Ranch storage tank, which in turn, supplies water to the ranch headquarters. TDS concentrations in the spring located 1,600 feet upstream of the "Old" Reservoir were 950 mg/l. Spring locations are shown on Figures 1 and 4.

RECOMMENDATIONS

The production volumes described in the Well Production section of this report are averages based on meter readings that reflect several months of well pumping. To determine accurate, monthly irrigation volumes, Cleath & Associates recommends that pumping start times and end times, with dates, be recorded for each irrigation well, each time the well is operated. In addition, the meter readings and flow rates should be recorded. To determine an accurate rate of production in the domestic system, Cleath & Associates recommends that flow meters be installed and monitored periodically at F.V. Wells #2 and F.V. Wells #4.

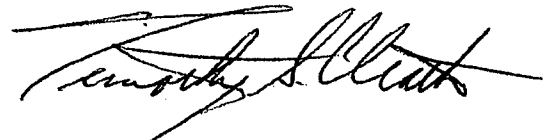
Ground water levels change seasonally, during droughts, and in response to pumping. To gain an understanding of available ground water in storage, and changes in water levels at the site, it is recommended that static water levels in the four irrigation wells and in the two domestic wells be recorded on a monthly basis.

If you have any questions concerning this report, please contact us.

Sincerely,



David R. Williams
Staff Geologist



Timothy S. Cleath, HG 81
Principal Hydrogeologist

attachments



References

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